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FOUNDED BY WILLIAM HUNTING, F.R.C.V.S.

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URINE TESTING.

The Continental note on this subject which we print to-day is of interest in one respect—it refers to a diagnostic method which, though universally admitted to be very important, is as yet practically unused by English clinicians. Nearly all medical men test urine very frequently, as a routine diagnostic measure. Very few veterinary practitioners ever test it at all. Of course, there are obvious difficulties in the way of testing the urine of veterinary patients; and probably these account for the fact that it is practically never done. Though the difficulties are insurmountable in some cases, they could certainly be overcome in many others; and we should endeavour to bring urine testing into routine veterinary diagnosis. So much information may be gained from it, especially perhaps in canine practice, that our continued neglect of it is a reproach to the profession.

THE SOCIETIES.

Most of our professional associations continue to meet; but so many members are away that the Secretaries must have even more than the usual difficulty in finding papers for discussion. In addition, the range of subjects likely to produce good discussions is narrower just now than usual. Veterinary politics are stagnant; and there is not much doing in the way of preventive medicine.

Before very long, it is true, some country members will have had sufficient experience of the serum treatment for swine fever to permit a profitable comparison of notes; but that time has not yet arrived. In the meantime, essayists can fall back upon the everyday clinical subjects which, after all, form the chief interest of the working practitioner's life, and the main source of his livelihood. Here they have ample material, both as regards amount and variety. There are many already oft-discussed subjects which could advantageously be re-discussed; there are others which have so far been discussed little, or perhaps hardly at all. There is no difficulty in finding subjects for discussion; the difficulty is to find members willing to introduce the subjects, and this will be accentuated now that so many of the younger men are away. Here is a chance for some of those numerous members who have never yet given their colleagues the benefit of their professional experience. Every man who spends his life in practice has experience which could produce many papers worthy of discussion.

TREATMENT OF NEMATODE DISEASES.

May I be allowed to add a few remarks on Mr. Gaiger's most interesting criticism of Prof. Craig's paper on the above subject.

On examining the blood of camels for T. Evansi I several times found filarial embryos in apparently healthy animals, and they appeared to exert very little influence on condition.

Regarding "prickly heat" in horses, I have seen some cases show rapid recovery after a single dose of Soamin injected intramuscularly, but, on the other hand, I have had some cases which showed no improvement whatever.

I quite agree with Mr. Gaiger's refutation of Mr. Place's statement that bursati is a form of cutaneous filariases. I had considerable experience of this disease in a station where its prevalence was as great as, if not greater than, anywhere else in India, and never once found the filarial embryos described by Lingard.

The disease used to make its appearance regularly, shortly after the commencement of the monsoon, when flies were most prevalent. Excepting wounds, which, of course, could be on any part of the body, the parts affected in order of frequency were: (1) the angle of the mouth and the lips; (2) the eye; and (3) the urethral projection of the penis, and more rarely the anus and vulva.

Now, if one went round a stable at this time of the year, these parts are almost invariably covered with flies; especially is this the case regarding the mouth after feeding, for the lips are covered with bran, and a small collection is generally seen in the angle of the mouth. This being so one naturally associates the fly with the disease. Mr. Gaiger says flies have no connection with bursati, and that it is probably due to inoculation. I quite agree with the latter remark, but I think the inoculator may prove to be the fly.

T. LISHMAN, Capt. A.V.C.

"ON THE USE OF CERTAIN ANTISEPTIC SUBSTANCES IN THE TREATMENT OF INFECTED WOUNDS."

By W. R. DAVIS, Enfield.

In a paper with the above title, extracts from which are reprinted in *The Record* of Sept. 25, occurs the following:—

"Mercuric chloride is probably the least useful and most objectionable as an antiseptic for the treatment of infected wounds—readily loses most

of its antiseptic action in presence of many tissue constituents and, as is well known, is irritating even in dilute solution."

Thus do we lose our illusions. For the past thirty years I have relied on this chemical in the treatment of wounds in the larger domesticated animals, and have learnt to put the greatest confidence in it. I have never had a case of tetanus but once during all that time in animals that I have been called on to treat for wounds (the exception was a case of very severe broken knees, both limbs affected and numerous pockets formed). I have not only used it for my patients, but I have applied it to my own not infrequent wounds, contusions, bites and scratches, so that I am in a position to affirm that whether its antiseptic properties when applied to wounds are small or great, Mercuric chloride in dilute solution is certainly not irritant.

A fortnight ago I received several painful contusions in the right knee in a motor bicycle accident. I had a bottle of solution of perchloride 1:500 with me, and I soaked a pocket handkerchief with this, fastened it round the knee, and left it on all day. I certainly felt no irritation from the compress, rather felt the greatest comfort from its presence.

I must say that I experienced a sense of almost personal affront in reading about the alleged shortcomings of my old favourite. It will take more than test tube experiences to make me give up the use of Hyd. perchlor. in the treatment of wounds.

ABSTRACTS FROM FOREIGN JOURNALS.

Researches upon the Physical, Chemical, and Microscopical Properties of the Dog's Urine in Health and Disease.

L. Lüth has published the following results of researches into this subject.

The colour of the normal canine urine is light yellow, golden yellow, or brownish yellow. In nephritis the colour is pale yellow, in cystitis light yellow, in distemper light yellow to brownish yellow; and when increased quantities of bile pigment and indican are present, the colour is brownish yellow. The transparency of the urine is impaired in cystitis and nephritis, and generally also in distemper. A thick consistence is rare. Normal dog's urine has an unpleasant broth-like smell; severe cystitis causes an ammoniacal pungent smell. Different drugs impart a special smell to the urine—sometimes sweetish, sometimes aromatic.

The specific gravity ranges from 1005 to 1050. It is low when diuretics are administered, high in feverish conditions. Albuminuria and the presence of bile pigments or indican do not alter the specific gravity. The normal acid reaction becomes alkaline in many diseases.

Physiological albuminuria amounts to rather less than 0.01%, and 0.2% should be regarded as its maximum limit. For the clinical demonstration of albumen the use of one method is insufficient; two or three must be employed. The most useful tests for the dog's urine are the Salicyl-sulphonic acid test, the heat test with the addition of nitric acid, and Heller's test. The potassium ferro-cyanide test is not reliable.

Bile pigments are to be met with in the most different diseased conditions. Gmelin's test suffices for their demonstration. Rosin's test is unsuitable for the dog's urine.

Eleven years' statistics of the Berlin clinique show that out of 107,111 canine cases—partly internal and partly external affections—only 26 cases of diabetes mellitus were found. The proportion of diabetic cases was thus less than 1 in 4000.

Increased indican-content of the urine occurs in intestinal affections of the most different character.

Leucocytes in small numbers are almost constant constituents of the urinary sediment; and they only become significant when they appear in larger quantities. Vesical epithelium and renal cells occur not rarely; and, when in small quantities, they indicate neither cystitis nor nephritis. Hyaline and slightly granular cylinders are frequent constituents of the normal canine urine; and so are spermatozoa. Micro-organisms in freshly voided urine indicate diseases of the urinary passages.

Crystals of triple phosphate, when they occur in fresh urine, should arouse the suspicion of a nephritis. Oxalate crystals have no special significance.—(*Berliner Tier. Woch.*)

W. R. C.

Observations on the Methods of using the Agglutination Test in the Diagnosis of Disease in Bovines caused by the Bacillus of Contagious Abortion.

By. H. R. Seddon, B.V.Sc.
(Veterinary Research Institute, Univ. of Melbourne).

(*Concluded from p. 141.*)

Quantitative Factors in the Agglutination Reaction.

An unfortunate terminology has crept into descriptions of agglutination methods—probably a relic from the descriptions of the so-called Widal reactions with serum of typhoid patients—in which frequent use is made of the term "dilution," to express the amounts of serum (or other diagnostic fluid) necessary to bring about agglutination.

The following experiments show that the sensitiveness of the reaction is to be measured by accurate determination of the minimal quantity of serum employed; in other words, it is not simply a matter of dilution, but a quantitative reaction.

Experiments.—To determine whether—(1) The *relation* of the quantity of pure serum to the quantity of fluid in a tube (*i.e.*, degree of dilution), or (2) The *amount* of pure serum in the tube, is the determining factor in agglutination of a particular serum.

Serum collected from a cow thirteen days previously was used, a basal dilution of 1 of serum to 49 of carbolised saline being made (1 in 50).

The emulsion was standardised in accordance with the usual method, and found to be of a standard "10 X."

Set 1a.—Ten tubes were put up, as follows :—

	A	B	C	D	E	F	G	H	J	K
Serum (1 in 50)	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	0.25 c.c.
Carbolised saline	0.0	0.5	1.0	1.5	2.0	1.25	1.5	2.0	2.5	1.75 c.c.
Total volume	1.0	1.5	2.0	2.5	3.0	1.75	2.0	2.5	3.0	2.0 c.c.
Relationship of serum to fluid 1 in	50	75	100	125	150	175	200	250	300	400

Of each of these dilutions 1 c.c. was put in a tube, and the tubes similarly lettered, so that the *amounts* of pure serum in these tubes were :—

A	B	C	D	E	F	G	H	J	K
0.02	0.012	0.01	0.008	0.006	0.0056	0.005	0.004	0.003	0.0025 c.c.

Emulsion (0.05 c.c., Standard 10 X) was then added to each tube and the tubes incubated till next day, when readings were taken.

Results :—A, B, and C, agglutination and clearing. D and E, agglutination. F, slight agglutination. G, H, J, and K, no agglutination.

Set 1b.—Another ten tubes were put up similarly to above (Set 1a), but with 0.1 c.c. of emulsion (*i.e.*, double quantity) added.

Results :—A, agglutination and clearing. No agglutination in other tubes. *Note.*—In these two sets of tubes actual *dilution* of serum in total fluid (neglecting the small amount added with the emulsion) was the outstanding test.

Set 2a.—Serum and carbolised saline were placed in tubes as in Set 1 :—

	A	B	C	D	E	F	G	H	J	K
Serum, 1 in 50	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	0.25 c.c
Carbolised saline	0.0	0.5	1.0	1.5	2.0	1.25	1.5	2.0	2.5	1.75 c.c

The bacterial emulsion was added to the whole of the fluid in each tube (not to 1 c.c. of each dilution.) Emulsion added (0.05 c.c.), and tubes incubated as in Set 1a.

Result :—Agglutination and clearing in all tubes from A to J, inclusive. No agglutination in K.

Set 2b.—Tubes put up similarly to last set (Set 2a), but with 0.1 c.c. of emulsion (double quantity) added.

Result :—Agglutination and clearing in A, B, C, D, and E. No agglutination in other tubes.

The actual *dilution* of the serum in these tubes, therefore, is the same in both tests (Sets 1 and 2), but the actual *amount* of serum in each tube is not the same in correspondingly lettered tubes in each test.

With each set, *control tubes* were put up, containing (1) serum and saline, and (2) emulsion and saline.

Note on Readings—"Agglutination" is to be interpreted as a definite macroscopic aggregation of organisms into clumps deposited either at bottom of tube or at bottom and along sides of tubes.

"Clearing," where the supernatant fluid is free to the naked eye, of suspended organisms—*i.e.*, agglutination and sedimentation.

"Slight," where there is a trace of agglutination deposit—not what one might with confidence call a definite agglutination. These "slights" are read as *negative agglutinations*, in considering the agglutination titre of a serum.

Conclusions.

(1) Using the same quantity of emulsion in each tube, *tubes possessing the same dilution (but different quantities) of serum do not furnish parallel results.* (Compare Set 1a with Set 2a, Set 1b and 2b, etc.)

(2) Using the same quantity of emulsion in each tube, *tubes containing the same quantity of serum do furnish parallel results.*

(3) The agglutination titre varies with the quantity of emulsion used, for :—

(*a*) With 0.5 c.c. of concentrated emulsion (10 X), the minimum amount of this serum which will produce agglutination is 0.006 c.c.

(*b*) With 0.1 c.c. of concentrated emulsion (10 X), the minimum quantity of serum required is 0.02 c.c.

Experiments were then carried out to test the effect of dilution on an agglutination system.

Tubes were put up, containing :—

	A	B	C.	D.
Pure Serum	0.02	0.015	0.01	0.005 c.c.
Emulsion (10 X)	0.05	0.05	0.05	0.05 c.c.

Test 1—Volume of fluid in each tube made up with carbolised saline to 1 c.c.

Test 2—Volume of fluid in each tube made up 2.5 c.c.

Results, both tests :—A and B, agglutination and clearing. C, agglutination. D, no agglutination.

Test 3—A tube was put up, containing 0.02 c.c. pure serum and 0.05 c.c. emulsion (10 X), and carbolised saline added *up to 20 c.c.*

Result :—Agglutination.

These tests show that the dominating factor is the *quantity* of serum in each tube, and not the degree of dilution. Of course, if equal quantities of each dilution be taken for testing, the quantity of serum in the tube will vary as the dilution (as is shown in the Set 1a). On the other hand, in the practical application of the agglutination test the important figure is what may be termed the "end-point"—*i.e.*, the smallest quantity of serum which will produce agglutination with a standard quantity of emulsion. The necessity, therefore, arises for taking for all tests an exactly similar quantity of diluted serum, hence it is advisable to refer to the agglutinating titre of a serum as "so many cubic centimetres of serum," and not as "up to a dilution of such and such." For the statement of the dilution to be of any guide to other workers this must be supplemented by a statement referring not only to the actual amount of diluted serum used, but to the actual quantity of emulsion used also.

Adopting the suggested method—*i.e.*, the statement of the exact quantity of serum used, the amount of emulsion used is the only supplementary factor required to be known, for, as is shown by these experiments, and by the following section, the amount of emulsion markedly and in a regular manner affects the agglutination titre.

Influence of Quantity of Emulsion on Agglutination. Also a note on a peculiarity of agglutination.

As is indicated in the preceding experiments, the quantity of emulsion present in a tube in which there is a certain definite amount of serum (or, in other words, the proportion between the amount of emulsion and the amount of serum), has a bearing on whether that parti-

SERUM. c.c. of pure Serum.	EMULSION. c.c. of Standard X. 10	8	6	4	2	1	0.8	0.6	0.4	0.2	0.1
0.2	++	++	++	++	+	+	+s	++	++	++	++
0.16	++	++	++	++	++	+	+	++	++	++	++
0.12	+	+	++	++	++	+	+	+	++	++	++
0.08	—	+	+	++	++	++	+s	+	+	++	++
0.04	—	—	+	+	++	++	++	+s	+	+	++
0.02	—	—	—	—	+	++	++	++	++	++	++
0.016	—	—	—	—	—	+	++	++	++	++	++
0.012	—	—	—	—	—	+	+	++	++	++	++
0.008	—	—	—	—	—	—	+	+	++	++	++
0.004	—	—	—	—	—	—	—	—	+	++	++
0.002	—	—	—	—	—	—	—	—	—	+	++
0.0016	—	—	—	—	—	—	—	—	—	—	—
0.0012	—	—	—	—	—	—	—	—	—	—	—
0.0008	—	—	—	—	—	—	—	—	—	—	—
0.0004	—	—	—	—	—	—	—	—	—	—	—
0.0002	—	—	—	—	—	—	—	—	—	—	—

cular quantity of serum will show agglutination of the bacilli or not.

The tests, 1a and 1b (see Conclusion 3), showed that whereas with 0.05 c.c. of emulsion (Standard 10 X) agglutination occurred with quantities of serum varying from 0.006 c.c. up, with 0.1 c.c. of the same emulsion the smallest quantity of serum to give agglutination was 0.02 c.c.

To further elucidate this relationship, a large number of tubes, with varying proportions of emulsion and serum, were put up. On account of the wide range in quantities over which the experiment was made, various concentrations of serum and of emulsion were used in actually making the test.

These basal dilutions were :—

Of serum :—1 in 5, 1 in 50, and 1 in 500.

Of Emulsion :—A standard suspension "X," and also one standardised to 10 X—*i.e.*, 10 times as strong.

The quantities of emulsion used are stated throughout the table in terms of standard X emulsion, but for those tubes shown in the table as containing 1 c.c. and over of standard X emulsion, the 10 X emulsion was used; the amounts of this (standard 10 X) that were put in being 0.1, 0.2, 0.4, 0.6, 0.8, and 1 c.c. respectively. Similarly in regard to the serum—for those tubes shown as containing 0.04 c.c. of serum and over, the basal dilution of 1 in 5 was used, the quantities of this that were put in being 0.2, 0.4, 0.6, 0.8, and 1 c.c. respectively; for those tubes shown as containing from 0.002 to 0.02 c.c. of serum a basal dilution of 1 in 50 was used, the quantities being 0.1, 0.2, 0.6, 0.8, and 1 c.c. respectively; for those tubes shown as containing less than 0.002 c.c. of serum, a basal dilution of 1 in 500 was used, the quantities of this that were put in being 0.8, 0.6, 0.4, 0.2, and 0.1 c.c. respectively.

In each tube the total quantity of fluid was made up to (approximately) 2 c.c. Control tubes were put up, (1) of serum, and (2) of emulsion, and in each case remained unchanged.

These tests show that the quantities of emulsion and of serum combining to produce agglutination bear a direct relationship to one another. The result is particularly striking if one takes the extreme results ("the agglutination and clearing," end-point, shown by ++), which are found to form a straight line when plotted as a graph.

It will also be noted that this arrangement is kept up over the whole length of the series.

One further point is evident from this table—namely, that there is a partial inhibition with certain proportions of emulsion and serum, as may be seen from looking at the tubes containing :—

2 c.c. emulsion and 0.2 c.c. serum;
1 c.c. emulsion, and 0.2, 0.16, and 0.12 c.c. serum;
0.8 c.c. emulsion, and 0.2, 0.16, 0.12, and 0.08 c.c. serum;
0.6 c.c. emulsion, and 0.12, 0.08, and 0.04 c.c. serum;
0.4 c.c. emulsion, and 0.08, and 0.04 c.c. serum;
And 0·2 c.c. emulsion, and 0.04 c.c. serum.*

Comparing these with tubes lower down in the same column where the amount of serum is less, we find that where the smaller quantities of serum are used there is again complete agglutination and clearing. Further, where larger quantities of serum are used, there is also agglutination and clearing, the inhibition thus being apparently zonary. This is well seen in the columns of tubes containing—0.8, 0.6, 0.4, and 0.2 of emulsion.

Further, in the table, this zone of inhibition is found to lie approximately parallel to the agglutination end-point; it seems, therefore, as if there were at least two maxima of agglutination, for a given quantity of serum, varying with the quantity of emulsion, and, between these two maxima, the zone of inhibition.

A peculiar agglutination phenomenon similar to this had been noted before with serum from the same animal.

In this previous test the same amount of emulsion was used in each tube, and the following quantities of serum placed in tubes :—

A	B	C	D	E	F	G
0.15	0.1	0.075	0.05	0.02	0.01	0.005 c.c.
+	+	+	++	++	+	—

After incubation for 24 hours, there was agglutination deposit in all the tubes except G, but there was a marked increase of opacity of the supernatant fluid going from C to A—*i.e.*, with the greater amount of serum. The only tubes where the supernatant fluid cleared were D and E. After incubating for a total of four days, all the tubes—A, B and C—showed clearing. Emulsion control, it should be noted, remained unchanged—*i.e.*, were not sedimented. It was considered at the time that, as the most outstanding feature was the failure of A, B and C to sediment, the cause might be physical, and that the reason sedimentation did not occur was because of the increased viscosity in these tubes, due to the large amount of serum. In view of the further experiment detailed above in table, and of the mention by Hewlett of a similar phenomenon of a

* An enclosing line is used in the table to make these tubes more evident.

zone of inhibition with *M. Melitensis*, no suggestion as to the cause is offered. No opportunity of consulting the work referred to by Hewlett has been possible, but phenomenon, in the main, seems parallel.

The phenomenon is of importance in that an apparent falling off in the agglutinating power of a serum does not necessarily mean that the end-point is to be expected in the next tube.

There may be a zone of lessened agglutination, and then a further increase may be met before the end-point of agglutination reaction. This "end-point" of reaction figure is important in Contagious Abortion, as it affords a means of comparing an animal's condition from time to time as regards the progress of the disease,

Optimum amount of Emulsion to use.

Here, again, there being no universal standard adopted observers cannot strictly compare their results. Thus, to say that an animal, 0.05 c.c. of whose serum produces agglutination, should be considered as affected, in reality conveys no definite meaning, in view of the experiments above, unless the amount of emulsion be stated at the same time. On the other hand, workers find by experience what is a convenient quantity of emulsion to use, based on the size of the tubes employed, etc., and having found this amount retain it as a standard, and use this in future; their own results, therefore, are strictly comparable with one another, but not with those of other workers.

The following experiments were made to determine what quantity, allowing for ease of reading after 24 hours' incubation, was suitable to use.

Material.

Serum, from Cow (as used in previous tests).

Emulsion (standardised, = "10 X").

Four sets of tubes, numbered 1, 2, 3, 4, were put up, using a different quantity of serum in each set. Each set consisted of four tubes—A, B, C, and D, and the quantity of emulsion used was:—

in the	A	tubes	0.05 c.c.	10 X emulsions.
"	B	"	0.025 c.c.	" "
"	C	"	0.01 c.c.	" "
"	D	"	0.005 c.c.	" "

To Set 1 was added 1 c.c. diluted serum (equal to 0.02 c.c. pure serum), and carbolised saline was added, to make the Total Vol. 2 c.c.

To Set 2 was added 0.5 c.c. diluted serum equal to 0.01 c.c. pure serum), and carbolised saline was added, to make Total Vol. 2 c.c.

To Set 3 was added 0.25 c.c. diluted serum (equal to 0.005 c.c. pure serum), and carbolised saline was added, to make the Total Vol. 2 c.c.

To Set 4 was added 1 c.c. diluted serum (equal to 0.02 c.c. of pure serum), and carbolised saline was added, to make the Total Vol. 20 c.c.

Controls.—Serum controls were put up, and remained unchanged.

Emulsion control tubes, of each quantity of emulsion used, with carbolised saline added, were put up, and remained unchanged.

Sets 1, 2, and 3 were read at the end of 24 hours' incubation, the result being:—

	A	B	C	D
c.c.	0.05	0.025	0.01	0.005
Set 1, pure serum 0.02 c.c.	+	+	+	+
Set 2, pure serum 0.01 c.c.	+	+	+	+
Set 3, pure serum 0.005 c.c.	−	+	+	+
Set 4, pure serum 0.02 c.c.	+	+	+	?

Note.—Set 4, at the end of 24 hours' incubation, showed positive agglutination with 0.05 c.c. of emulsion—*i.e.*, in tube A, but not in the other tubes—B, C, and D.

In tubes B and C, containing 0.025 and 0.01 c.c. emulsion, a positive agglutination was manifest at the end of three days' incubation, but the deposit in tube D, with 0.005 c.c. emulsion, even at the end of this time, was very small indeed—in fact, barely appreciable.

The controls, it should be mentioned, remained unchanged.

From these experiments it appears as if the large volume of fluid (20 c.c.) in Set 4 affected the rate of sedimentation of the clumps of bacilli in those tubes with the smaller quantities of emulsion. As, however, such a large quantity of fluid is not used in the tubes in making a diagnostic test, these results in Set 4 are not of great importance. In the practical application of the test the total volume of fluid in each tube is usually made up to about 1.5 c.c. A number of tests have also been made in which the total amount was 2 c.c. The tubes in Sets 1, 2 and 3, where the total volume has been made up to 2 c.c., are, therefore, of primary importance. Here it is found that such a quantity of emulsion and of total fluid have been employed that the complete agglutination reaction takes place within the first 24 hours.

Tubes of 2.5 c.c. capacity have been found very suitable in making the test, and the amounts of diagnostic material (serum, whey, etc.), and of emulsion, are, even over a large range of quantities, but involving only a few different basal dilutions, easily contained in 1.5 or 2 c.c. of fluid. Also, 24 hours is a convenient time for incubation before reading the results.

Where the total volume of fluid in each tube is made up to 1.5 or 2 c.c., with incubation extending over 18 to 24 hours, *the optimum of emulsion will be the smallest quantity which gives results that are easily read*, whether the agglutination reaction be positive or negative.

The deposit following agglutination should be such that it can be easily distinguished by the naked eye, even though, as is frequently the case, the whole of the organisms be not sedimented.

In the absence of deposit—*i.e.*, in a negative agglutination reaction, there should be such a quantity of emulsion that a tube containing it can be easily distinguished from a tube not containing any emulsion.

It is of interest here to note the naked eye appearance of the emulsion controls to the sets of tubes under review. In four of these controls the total volume of fluid was made up to 2 c.c., with carbolised saline; in the other four to 20 c.c.

Amount of Emulsion.	Total Volume.	Naked Eye appearance.
(1) 0.05 c.c.	2 c.c.	cloudy.
(2) 0.025 c.c.	2 c.c.	faint cloudiness.
(3) 0.01 c.c.	2 c.c.	trace of cloudiness.
(4) 0.005 c.c.	2 c.c.	no cloudiness.
(5) 0.05 c.c.	20 c.c.	faintly hazy.
(6) 0.025 c.c.	20 c.c.	trace of haziness.
(7) 0.01 c.c.	20 c.c.	haziness appreciable only on comparison.
(8) 0.005 c.c.	20 c.c.	no haziness.

Of those emulsion controls containing 2 c.c. of total fluid, it will be seen that (1) and (2) above possess such a degree of cloudiness that they are readily distinguishable to the naked eye as containing emulsion.

These tubes contain 0.5 c.c. and 0.025 c.c. respectively.

In Sets 1, 2 and 3 of agglutination results recorded above the smallest deposit (positive agglutination), which

is easily read (tubes containing 2 c.c. of fluid), is that where there is 0.025 c.c. of emulsion.

In Set 4, the only tube where (although there was the same quantity of serum in each tube), agglutination was manifest in 24 hours, was that one in which there was 0.05 c.c. of emulsion in the tube.

With this large volume of fluid (20 c.c.), no smaller quantity gave a completed reaction in 24 hours.

From these experiments, therefore, it has been concluded that the optimum amount of emulsion to use is 0.05 c.c. of "Standard 10 X" emulsion (or 0.5 c.c. of "Standard X" emulsion).

This amount, 0.5 c.c. of "Standard X" emulsion has, therefore, been adopted for use in all practical diagnostic tests for the reasons that:—

(1) It gives a marked naked eye deposit (and hence in easily read), in a positive reaction;

(2) Conversely, it gives a definitely cloudy appearance (and hence is easily read), in a tube where there is no agglutination.

(3) With the total volume of fluid in the tube anything from 1½ to 20 c.c., the agglutination reaction is complete in 24 hours.

(4) It is the minimum amount of emulsion that will answer the above requirements.

In conclusion, I wish to express my best thanks to Professor H. A. Woodruff, Director of the Institute, for permission to undertake this work, and for much kindly help and advice.

BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

[NATIONAL V.M.A. NORTHERN BRANCH].

A meeting was held in the Bush Hotel, Carlisle, on Saturday, 18th Sept., 1915.

Present:—Mr. Barrow (President), Messrs. Garnett, Hewson, Lindsay, Bell, Pollock, Donald, Bowlas, and and Secretary (Mr. R. Craig Robinson).

The meeting was called by the President, to consider two letters received from Mr. Donald.

Mr. F. W. Garnett was elected to the chair, which he vacated shortly after, on the arrival of Mr. Barrow.

The minutes of the previous meeting were read and confirmed.

The letters in question had reference to a statement concerning tuberculin testing made in course of conversation at the previous meeting, but subsequent to the conclusion of the meeting, to which Mr. Donald took exception.

[Mr. Donald had, some time since written a letter which appeared in the public press in Scotland, on the methods of some practitioners in tuberculin testing, which was a slur on the profession. At a meeting of the Border Counties Veterinary Society, on April 10, 1915, this letter was considered.]

The present meeting was mainly conversational in character, in the course of which—

Mr. DONALD stated: "The practice I have been condemning is that veterinary surgeons are known to test cattle and give a certificate, but allow the temperatures to be taken by the owner or his agents."

Mr. GARNETT: I should like to object to that statement by Mr. Donald, and unless he has proof of it it must not go forward. It is damaging to the profession, and has done a great deal of damage already. He makes general charges and is accusing the whole profession of doing this. I ask him to mention the men. Where are his facts now? If they are true, I will bring them before the Council to act.

Mr. DONALD: No, you misunderstood me. All I said was what I was complaining of in others, and this Society considered the matter, and they came to the conclusion if a guilty man could be found he ought to be exposed. I think it is their duty to expose him. I understand that Mr. Hewson has named a guilty man, and I am him.

Mr. HEWSON: To simplify matters I did say—the meaning of it was—that Mr. Donald, in testing cattle, did not take the whole temperatures himself; he left a substitute to take them.

Mr. DONALD: I don't deny that I have allowed my son.

Dr. HEWSON: Was he qualified then?

Mr. DONALD: No.

Mr. HEWSON: The bulls were not tested for my brother. He tested them on his place.

The bulls in question are pedigree stock, and there is a record of where they were sold; I can supply you with that. I am sorry I thought that would not be necessary. I can get you the date.

Mr. GARNETT: What is complained of here was the letter in the public press. I ask you for a specific case where this has been done, or withdraw your letter.

Mr. DONALD: I will substantiate it at the proper time.

At a subsequent stage of the meeting Mr. Garnett said: It is immaterial who your informant was with regard to this general charge that veterinary surgeons go up and down testing bulls and giving certificates, and the owners taking the temperatures. That was publicly made. It should either be publicly withdrawn or publicly substantiated. I propose the Society calls on Mr. Donald to substantiate the charges made in the public press with regard to that matter.

I think it is a duty you owe us all, or else withdraw your letter.

Mr. DONALD: I am not going to withdraw it. I know the statements therein are true in substance and in fact, and more people know it than I.

You must not depart from the original strict terms of my letter.

Mr. LINDSAY: I think you are not doing your duty to the profession by allowing that to lie dormant. You cast a reflection on the profession. You ought to clear the remainder.

Mr. GARNETT: You publicly accused, in the public press, the veterinary surgeons that they are doing this thing. It was in the *Scottish Farmer*.

Mr. LINDSAY: I can assure you that Mr. McNeilage, of the *Scottish Farmer*, went for the veterinary inspectors. He showed them up in a most disgraceful manner.

Mr. GARNETT: I move formally:—The Society calls upon Mr. Donald to substantiate or withdraw that letter. It is a serious reflection on any veterinary surgeon's reputation.

Mr. LINDSAY: I beg to second Mr. Garnett's motion.

A vote was taken, and the President declared the resolution carried.

Mr. DONALD: Having passed that resolution, what is the nature of the substantiation you require, or withdrawal? How is the withdrawal or the charge to be made?

Mr. GARNETT: It will have to go before the Council. You will have to state a case.

Mr. DONALD: I should take it that I have to make it to this meeting—the men who have passed the resolution. Do they want the explanation?

Mr. GARNETT: I will make it that Mr. Donald gives information to the Secretary of the Royal College of Veterinary Surgeons, to lead to proving the substance of his letter. They will inquire into it, for a more unprofessional thing I never heard of—if it is true.

After further conversation—

The CHAIRMAN: I should like, before we close the meeting, that two Vice-Presidents, a Treasurer, and an Auditor be elected. The treasurership is joined with the secretaryship, and I think it would be better if it

was not, for the simple reason in matters of this kind we should have a meeting without calling a general meeting, many a time, to see into matters. I cannot call a meeting on rule 5, as there are no vice-presidents and no auditor.

It was decided to leave the matter over till the annual meeting.

PARLIAMENTARY.

In the House of Commons.

VETERINARY OFFICERS.

Mr. G. S. TERRELL asked the Under Secretary for War whether the bonus payable to veterinary officers of the Territorial Force under paragraph 497 was payable to all veterinary officers serving both at home and abroad.

Mr. FORSTER (Financial Secretary to the War Office), replied: The claims under Article 497 of the Pay Warrant of officers employed under the conditions of Article 496 are not affected by the question whether their service is given at home or abroad.

The Kennel Club.

The possession of Olympia being required for a further period by the War Office the committee of the Kennel Club are reluctantly compelled to abandon their show for 1915. It is impossible, in their opinion, to come to any other decision, if for no other reason than their inability to obtain the use of a suitable building for the purpose. The Kennel Club Retriever Trials for 1915 have also been abandoned.

ARMY VETERINARY SERVICE

Extract from *London Gazette*,

WAR OFFICE, WHITEHALL, Sept. 24.

REGULAR FORCES. ARMY VETERINARY CORPS.

Temp. Lieutenants to be temp. Captains:—
E. Nicholson. Dated Aug. 6.
W. H. Priston. Dated Aug. 31.
C. W. Makinson. Dated Sept. 7.

Sept. 27.

Temp. Major E. E. Bennett to be temp. Lt.-Col. whilst holding appmt. of Asst. Dir. Vet. Serv. Dated Sept. 28.

Capt. J. O. Andrews to be temp. Major whilst holding appmt. of Asst. Dir. Vet. Serv. Dated Sept. 7.

Sept. 28.

Temp. Lieuts. to be temp. Captains:—
A. Young. Dated Aug. 13.
W. D. Halfhead. Dated Aug. 17.
J. McL. Dawson. Dated Aug. 25.
E. A. Phipps. Dated Aug. 29.
A. R. Smythe, E. S. Dixson. Dated Aug. 31.
J. S. Young. Dated Sept. 1.
W. W. Lang. Dated Sept. 4.
E. E. Jelbart. D. Hannay. Dated Sept. 7.
A. C. Smart. Dated Sept. 8.
J. B. Walker. Dated Sept. 12.
R. C. Allinson. Dated Sept 13.
J. E. Young, J. Godber. Dated Sept. 15.
R. P. Johns. Dated Sept. 18.
J. P. Dunphy. Dated Sept. 19.

To be temp. Lieuts:—
A. Plant. Dated Sept. 14.
W. Gardner. Dated Sept. 16.

Sept. 28.

Lieut. W. N. Jürgensen to Capt. Dated Sept 3.

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

Sept. 24.

Lieut. G. McIntyre to be Captain. Dated Aug. 19.

Sept. 25.

To be Lieut.:—J. R. Welsby. Dated Sept. 26.

Sept. 29.

Temp. Lieut. R. J. Collings to be temp. Capt. Dated Sept. 16.

Temp. Lieut. P. A. Wilks relinquishes his commission. Dated Sept. 8.

OVERSEA CONTINGENTS.—CANADIAN A.V.C.

Sept. 25.

Lieuts. to be temp. Captains:—
C. V. Best, A. E. Cameron, A. H. Hunter. Dated July 1.

The following casualties in the Mediterranean Expeditionary Force are reported:—

DIED—Sgt. D. Horsley, 108.
Corpl. G. Harrison, 1444.

WOUNDED—Sgt. M. Staples, 4991.

The A.V.C. Comforts Fund.

Mrs. MOORE requests us to announce that her address from October 1st will be—

Strathyre, Parsifal Road,
Hampstead, London, N.W.

She hopes that all subscribers and contributors to the Army Veterinary Corps Comforts Fund will accept this intimation of the change of address for parcels and letters.

Personal.

MAYOR—VINCENT. On Sept. 22, at St. Peter and St. Paul, Horndon-on-the-Hill, Essex, by the Rev. Sydney Fischel, assisted by the Revs. Vincent Iremills and Burgess, George Gordon Mayor, of Addlestone, Surrey, and Millicent Kirk, elder daughter of Sydney Vincent, M.R.C.V.S., and Mrs. Vincent, of Brentwood, Essex.

Mr. ROBERT BRYDON, aged 71, of The Dene, Seaham Harbour, Durham, one of the best-known agricultural horse breeders, a member of the Royal College of Veterinary Surgeons, left estate valued £46,394.

OBITUARY.

TODD.—On the 25th Sept., at 109 Royal Parade East, Eastbourne, Henry Arthur, the infant son of Maj. A. G. Todd, A.V.C., aged seven weeks.

VALIDITY OF AGREEMENTS

Sir,—*Re* enquiry of "Pro Bono Publico" in your issue of 25th inst.,—

The agreements to which he refers are known in Law as "Contracts in Restraint of Trade."

It must be admitted that of late years judges have shown a marked disposition to closely criticise such agreements and to declare them invalid if they contain what seem to the Judges to be harsh provisions. But they are still held to be binding on the employee, provided the area covered and the duration are reasonable and no more than sufficient to protect the interests of the employer.

It is usually held by the Courts that, for the Professions, a radius of ten miles and a duration of ten years are not unreasonable. But in one case, affecting a solicitor, it was decided that a radius of twenty miles was not unreasonable, since the business of a solicitor is mainly transacted in his office.

Sept. 28, 1915. Yours truly, LEX.

Siamese Veterinary Students.

There is now a veterinary school in Bangkok. Mr. G. J. Harvey, veterinary surgeon to the Ministry of Agriculture, has had seven students in his care for the last six months, and they show every promise of becoming proficient in their profession, as they have an aptitude for the work and already are able to do a good deal on their own account.

It was the intention of the Ministry of Agriculture to engage six British veterinary surgeons to do work of this nature in different parts of the country, but owing to the claims of the Army Veterinary Corps after the outbreak of the war it was impossible to obtain this number. Now, however, there is good reason to suppose that Siamese students will become sufficiently qualified to do the work themselves, though it will necessarily be some time before the number is anything like adequate to the demands.

Mr. G. J. Harvey, m.r.c.v.s., and his Pupils in Siam.

On the subject of cattle disease and the need of preventive measures, Mr. Harvey has gathered a good deal of information in the course of his journeys up country. There are three diseases very prevalent and fatal to cattle, namely, rinderpest, quarter ill, and anthrax. Man is susceptible to the latter.

Farmers and cattle owners do not have to travel their animals for pasture in this country, as it is plentiful within each village boundary, so disease is not spread in that way; but a sick animal is turned into the common herd to take its chance and thus spreads disease by contact, and also by infecting the grass. Human beings are infected by eating the meat of an animal which has died of disease. In one case there were a hundred and twenty deaths of cattle from anthrax, and forty deaths of human beings.

Another cause of infection is that the skin of a dead animal is kept until the Chinese buying agent comes round, and then starts on a journey, spreading infection all the way until it reaches a godown in Bangkok for export. As animals are not usually killed for food it is evident that most of the skins come from animals which have died of disease.

As regards preventive measures, inoculation for rinderpest will prove very expensive unless some control is exercised over the owner and his diseased animals. The spread of a local outbreak could be prevented by a law forbidding the skinning and eating of diseased carcases and by the inoculation of all uncontaminated animals.

The losses from disease have become so enormous that it is estimated that in the last three years, valuing oxen and buffaloes at Tcs. 30 each, and pigs at Tcs. 10, the country has lost property to the value of twelve million ticals. A law such as that suggested ought to reduce the loss by fifty per cent. in the first year, and in three years it should have practically declined.—*Bangkok Daily Mail.*

ANNUAL REPORT OF THE PUBLIC HEALTH DEPARTMENT OF THE CITY OF EDINBURGH, 1914, BY A. MAXWELL WILLIAMSON, M.D.

The veterinary work in this report comes under the heading of Administrative. Portions here printed give the greater part of the work done, omitting several tables, and some details. We conclude that next year the veterinary department will furnish its own report.

MEAT INSPECTION.

The number of cattle dealt with at the slaughter-houses during the year 1914 showed an increase of 1609 as compared with the previous year. There were 431 fewer calves, 397 fewer pigs, and 6856 fewer sheep.

A constant supervision was kept at the slaughter-house during killing hours, and no case of contagious disease was detected.

Tuberculosis is by far the most common disease found in the carcases of cattle, 214 animals being found more or less affected. A larger percentage of cows were affected with this disease than in the previous year on account of the numbers seized and slaughtered under the Tuberculosis Orders 1913 and 1914.

A large number of livers and lungs of cattle and sheep were destroyed on account of parasitic and other conditions.

The amount of foreign meat arriving in Edinburgh fell off greatly on the outbreak of the war. After the month of August the greater part of the chilled and frozen meat from abroad was taken over by the War Department authorities, and only a small amount arrived in this city. The deficiency, however, was made up by carcases of Irish cattle sent through from Glasgow, and the dead meat markets were kept well supplied.

Considerable quantities of Swedish pork continued to arrive at the port of Granton in a half-cured state, most of it being sent to Glasgow and Leith curing factories and only a small quantity retained in Edinburgh. All the cases and bales bore the stamp of the veterinary surgeon who had examined them before shipment.

A good many carcases arrived from country districts, and these were mostly of good quality, being accompanied by certificates from veterinary surgeons. Many country butchers sell the cheaper parts of carcases in their own districts, and send on the roasts and rumps to the Edinburgh meat markets. These have all been found satisfactory.

One diseased live cow was seized whilst exposed for sale in a fat stock sale yard, and the owner was fined £15.

Four quarters of cow beef were seized in one of the dead meat markets, and a fine of £50 was imposed on each of the two owners. The total fines for the year amounted to £115.

FOREIGN MEAT.

The following figures give approximately the amount of foreign, frozen, and fresh meat brought into the city during 1914 :—

Chilled and frozen beef	equal to	5,850	carcases.
Boneless meat ...	"	300	"
Pork in carcase, frozen	"	300	"
" " fresh (Dutch)	"	500	"
River Plate and Australasian mutton and lamb		31,000	"
Dutch and Colonial calves in carcase		2,200	"

Diseases found in the carcases seized in the slaughter-houses and throughout the city :—

Tuberculosis 167, Decomposing 36, Traumatism 11, Peritonitis 5, Œdema 11, Asphyxia 12, Emaciation 8, Pyrexia 1, Enteritis 9, Pneumonia 7, Mastitis 2, Poisoned 1, Atelectasis 3, Milk Fever 1, Metritis 3, Swine Fever 2, Vertigo 1, Dystokia 1. Total 281.

TUBERCULOSIS IN COWS.

Cows slaughtered during the year ...			655
Affected with tuberculosis ...	(12.36 %)		82
Consigned from the city			12
From beyond the city ...			70
Cows with tuberculous udders, city byres		9	
From beyond the city		26	
	(42.68 %)		35

Those from the city byres, with one exception, were slaughtered under the Tuberculosis Orders of 1913 and 1914.

COW BYRES.

There were at the end of the year 3 fewer dairy byre premises than in the previous year, and 72 fewer cows.

There were 61 dairy byre premises at the end of the year, and the number of cows housed therein was 2123, while 8 private byres contained 17 cows.

Tuberculosis is the disease most common in all dairy cows. 28 of these were removed from the city byres during the year. 13 of them were reported to the Inspector under the Contagious Diseases (Animals) Act. These were all seized and slaughtered by him under the Tuberculosis Orders. 15 were removed under the Edinburgh Municipal and Police (Amendment) Act, after the Tuberculosis Order ceased to operate, the Order being suspended on account of the war.

Four cows were removed on account of other conditions affecting their milk.

The country byres in close proximity to the city received more attention than hitherto, 90 visits having been paid to them, with the result that 10 cows were found suffering from tuberculosis. Five of these were detected as the result of visits paid to byre premises in consequence of the milk coming from them showing evidence of tuberculous affection. These cows were reported to the County Veterinary Inspector and dealt with by him under the Tuberculosis Order, which required the cows to be slaughtered, with compensation to the owner.

Microscopical examination in the Public Health Office Laboratory, of any discharge, such as milk, expectorate, etc., was always resorted to in order to assist diagnosis, and over 200 samples were examined during the year.

Bacteriological Examinations.—Milk	specimens	120
Expectorate	"	89
Lochia	"	2
Scrapings from rectum	"	4
Total		215
Tubercle Bacilli in the milk in ...	cases	21
in the expectorate		12
(In both expectorate and milk 3 cases.)		
Clinically tuberculous (no expectorate, and milk free from bacilli)		4
Re-acted to tuberculin		4
Total		41

DAIRIES.

The inspection and supervision of dairy premises and of the methods adopted in dealing with the milk supplies of the city have been carried out with the same diligence as in former years.

The measures referred to in the last report, which were directed against the prevailing neglect attaching to the conditions under which milk was conveyed by rail, have produced a very marked improvement during the past twelve months, so that only a comparatively small quantity of milk has been destroyed as unwholesome by reason of the condition of the vessels in which it was being conveyed.

The outstanding event of the year has been the passing of the Milk and Dairies (Scotland) Act, 1914, described in the preamble as an Act to ensure the Purity of Milk Supplies, and to regulate Dairies in Scotland and for other purposes connected therewith. This measure, which becomes operative during the current year, appreciably extends the limits of supervision presently in use, and will have the immediate effect of introducing a set of Regulations to be framed by the Local Government Board, and of affording the Local Authority an opportunity of remodelling the local Bye-laws.

It is interesting to notice that certain conditions pertaining to the trade and regarding which legislative control has been advocated in former issues of this Report are now provided for.

425 dairy-keepers are at present on the Register, and as byre premises are not included, being dealt with under a specific heading, this implies that 425 premises are used for the distribution of milk, either as retail shops or solely as depots for supplying shops and vans. Of the latter class there are three establishments in the city, so that there are actually 422 premises which come under the designation of dairy shops. The number of dairy-keepers involved is subject to slight modification if the duplication of names is taken into account, as certain of the larger dealers carry on business at various branches, the 425 names being reduced in this way to 408 individuals.

The reference to the large establishments conducting a dairy business pure and simple suggests a comparison with the class of shop, about 50 per cent. of the whole, where milk is nothing more or less than an "accessory or side line." That the latter type of business should have continued in such proportion up to the present is solely due to the limited powers hitherto possessed by the authorities. These shops undoubtedly add to the apparent volume of Sunday trading, and their existence implies, moreover, that the article of food most susceptible to improper treatment is being largely handled by a class of shopkeeper who regards it as a subsidiary commodity, and is besides incapable of appreciating the importance of its purity to the customer.

The Journal of the Board of Agriculture.

An Official Agricultural Journal published on the 15th of each month. Price 4d. Monthly, Post Free.

At the present time an endeavour is being made to publish matter of definite interest and value under War conditions. Summaries of Agricultural Experiments, Notes on Agricultural Co-operation and Small Holdings, and Market Prices appear each month. The Journal is usually illustrated.

Farmers, land agents, landowners and others are asked by the Board of Agriculture and Fisheries to support their Journal, which is definitely published for the benefit of all classes of agriculturists, and is accordingly sold at a very low price (Three months, 1s.; Six months, 2s.; Twelve months, 4s., Post Free).

The Journal should be bound and placed on the bookshelf of every agriculturist for reference purposes; it will answer hundreds of questions which are put to the Board every month.

DISEASES OF ANIMALS ACTS 1894 TO 1914, SUMMARY OF RETURNS.

Period.		Anthrax		Foot-and-Mouth Disease.		Glanders.†		Parasitic Mange. ‡		Sheep Scab.	Swine Fever.	
		Out-breaks (a)	Animals.	Out-breaks (a)	Animals.	Out-breaks (b)	Animals.	Out-breaks (b)	Animals.	(b)	Out-breaks (a)	Slaughtered. *
Gr. BRITAIN. Week ended September 25		6	6					8	15	2	27	118
Corresponding week in	1914 ...	9	12			2	17	4	4		94	598
	1913 ...	9	9					23	41	1	32	610
	1912 ...	5	5	3	44	4	8	12	14	2	27	445
Total for 39 weeks, 1915		442	503			36	66	‡628	‡1354	164	3163	13920
Corresponding period in	1914 ...	557	612	22	108	81	249	1530	2642	155	3157	31068
	1913 ...	411	453			121	298	1999	3999	134	1868	24987
	1912 ...	594	675	81	633	139	256	2415	5189	177	2345	30997

‡ The Parasitic Mange Order of 1911 was suspended from 6th August, 1914, to 27th March, 1915, inclusive.

(a) Confirmed. (b) Reported by Local Authorities. † Counties affected, animals attacked:

Board of Agriculture and Fisheries, September 28, 1915. ‡ Figures for twenty-six weeks only.

IRELAND. Week ended Sept. 25		...	...	...	...	...	...	Outbreaks 1	8	2	43
Corresponding Week in	1914 ...	...	...	...	...	...	...	...	7	...	1
	1913 ...	...	...	...	...	...	...	...	4	3	28
	1912 ...	...	...	1	2	...	...	...	1	3	9
Total for 39 weeks, 1915 ...		1	1	...	...	1	3	58	315	193	1100
Corresponding period in	1914 ...	1	1	76	957	...	...	67	407	161	842
	1913 ...	...	...	...	...	...	...	102	394	116	721
	1912 ...	3	3	29	263	...	...	53	266	186	1517

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Sept. 27, 1915

NOTE.—The figures for the Current Year are approximate only. * As diseased or Exposed to Infection.